Key Factors Leading to Disputes in the Final Account Closing of Construction Projects in Malaysia

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Abstract: The construction industry in Malaysia has been facing challenges with disputes in the final account closing in construction projects, which has become a significant concern for industry stakeholders. These disputes often arise due to various factors, making resolving them essential, especially since they can adversely affect construction projects' cash flow, productivity and reputation. This study aimed to examine the key factors that influence the occurrence of disputes in the final account closing stage of construction projects in Malaysia. A questionnaire survey was conducted to collect quantitative data from construction industry professionals to elicit their agreement on the various contributing factors to final account closing disputes. The data collection included G7 contractors, private clients and quantity surveying (QS) consultants in order, which were identified through a comprehensive literature review. In total, a number of 257 complete responses were gathered. This study found eight key factors that significantly contributed to disputes that hindered the prompt settlement of final accounts in construction projects. The factors were (1) delay in the evaluation and preparation of final accounts, (2) the complexity of variation claims, (3) approval issues related to variation work, (4) disagreements on the valuation of variation works, (5) poor record keeping, (6) late submissions of final claims, (7) disagreements on the valuation of final accounts and (8) cost overruns. Considering that the identification of these key factors is crucial to formulating appropriate strategies to minimise or resolve disputes in the final account closing process, this study is expected to provide information and assist construction stakeholders in adopting effective project management practices throughout the construction process. Accordingly, this reduces the likelihood of disputes and ensures the successful closing of the final account in construction projects.

Keywords: Final account closing, Disputes, Key factors, Construction projects, Contract management

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INTRODUCTION

The construction industry plays a pivotal role in economic development worldwide and is a significant driver of Malaysia's economic growth. The industry creates abundant job opportunities and provides infrastructure and facilities that support other sectors' activities (Fateh, Mohamed and Omar, 2022; Jinn, Hoe and Siew, 2024). A construction project, which typically consists of multiple phases and activities involving many parties, requires effective project management to ensure its successful completion. Notably, final account closing is a critical aspect of project management, as it signifies that all contractual obligations and financial matters of construction projects are settled fairly and transparently (Garner, 2015; Majid, 2017; Othman et al., 2023).

In general, final account closing in a construction project refers to the calculation and agreement of the final contract sum. It incorporates a fair valuation of all works conducted by the contractor, followed by the settlement of all financial transactions that satisfy the contractual parties involved in construction projects (Ashworth, Hogg and Higgs, 2013; Garner, 2015; Majid, 2017). The procedure involves three major activities, comprising compilation and submission of the claim for the final account, assessment and preparation of the final account, as well as finalisation and certification of the final account (Rajoo and Singh, 2012; Ramli, 2021; Zakaria, 2015). As such, the final account serves as a conclusive record that verifies the contractor's fulfilment of the work in accordance with the contract conditions and that the employer has successfully made all necessary payments, as stated in the contract. In addition, the final account closing stage significantly impacts the contractual relationships between the contractor, client and any other parties involved (Zakaria, Ismail and Yusof, 2013a; Ahzami, 2017). Most importantly, conducting these processes thoroughly and in a timely manner is vital to ensure the successful closing of the final account (Hisham and Othman, 2021).

In the Malaysian construction industry, final account closing has been a persistent challenge. It is a time-consuming process, often taking longer than the period specified in the construction contract (Hassan, 2019; Ramli, 2021). There is an abundance of criticisms of the final account of construction projects, where the settlement is performed in an unreasonable time and far beyond the period stipulated in the contract (Hassan, 2019; Nor, Judi and Ismail, 2023; Ramli, 2021; Zakaria, 2015). Notably, unresolved final account closures with outstanding issues and unaddressed claims are deemed unsuccessful projects, resulting in the detriment of both the client and contractor (Ssegawa, Rwelamila and Mogome, 2020). A recent study by Nor (2024) reveals that closing the final account after project completion can span up to seven years owing to many factors. This includes poor workmanship and quality, defects in work, variation orders and claims related to loss and expenses. In addition,

Nor, Judi and Ismail (2023) claimed that the final account closing process has always resulted in conflict and legal proceedings, which have prolonged the settlement period. This causes inconvenience and financial losses for contracting parties.

In addition, delays in final account closing cause delays in the final payment and may lead to disputes among contracting parties (Judi and Mustaffa, 2023). This will, in turn, affect the overall project's success and the relationship of the contracting parties (Othman et al., 2023; Yan, 2018; Zakaria, 2015). Additionally, delays in final payments due to disputes over final accounts significantly impact contractors' cash flows (Ishak, Alauddin and Ibrahim, 2020) and have ripple effects throughout the supply chain (Badroldin et al., 2017; El-adaway et al., 2017). Furthermore, the substantial costs associated with resolving disputes will adversely affect a construction project's cash flow, reducing productivity (Kong and Yeow, 2016; Matarneh, 2024). As a result, the construction industry's reputation has been adversely affected by the increasing delays experienced in closing final accounts.

Previous research has uncovered various issues regarding the final account closing process in the construction industry. This includes lack of experience and knowledge, unethical practice, contractual ambiguity, inappropriate variation orders, inadequate documentation and lack of communication (Hisham and Othman, 2021; Ilmi and Yip, 2014; Kong and Yeow, 2016; Othman et al., 2023; Ssegawa, Rwelamila and Mogome, 2020). Despite this, there is a dearth of extensive research examining the key factors that significantly contribute to disputes about the final account closing process and management in construction projects. Therefore, this study sought to recognise the key factors of disputes in final account closing from the perspective of key construction stakeholders, namely the contractor, client and quantity surveyor, in order to better comprehend its fundamental root causes. Accordingly, this information could be utilised to formulate appropriate and preventive solutions to reduce disputes pertaining to final account closing, ensuring the successful completion of final accounts.

LITERATURE REVIEW

The Importance of Final Account Closing Management in Construction Projects

Final account closing in the construction industry is essential for successfully completing construction projects and has significant implications for clients and contractors (Royal Institution of Chartered Surveyors, 2016; Majid, 2017). It is a critical process that ensures the settlement of the financial and contractual obligations of a project (Ashworth, Hogg and Higgs, 2013; Ssegawa,

Rwelamila and Mogome, 2020; Othman et al., 2023). It involves reconciling all costs, variations and relevant project expenses to determine the final amount due to the contractor or owed to the client. Time, cost, quality, safety and stakeholder satisfaction are the main criteria for measuring overall construction project success (Ramlee et al., 2016; Silva, Warnakulasuriya and Arachchige, 2016). For example, Hassan (2019) and Kong and Yeow (2016) discovered that the success of a construction project can be measured by its success in meeting project schedules, budget, quality and stakeholders' satisfaction with minimal dispute. However, Khang and Moe (2008) and Zakaria (2015) highlighted that even though a project is completed, it is still deemed partially successful if the final account is not closed. Accordingly, Ramli (2021) suggested that a project's success can be measured by successfully closing a final account at the end of a construction project and completing it within the contractually prescribed timescale. In addition, Zakaria, Ismail and Yusof (2022) asserted that failure to close the final account demonstrates the organisation's failure to manage the project well as specified in the contract. On this basis, it can be deduced that project success can be determined by completing the final account closing without any disputes that satisfy all stakeholders.

The Procedures of the Final Account in Construction Projects

The final account closing procedure typically commences following the issuance of the Certificate of Practical Completion (CPC) and should conclude after the end of the defect liability period or upon the release of the Certificate Making Good Defects (CMGD) (Hassan, 2019; Zakaria, 2015). This process encompasses three primary activities: final account submission, preparation and certification (Hisham and Othman, 2021). Construction contracts generally stipulate a timeframe for completing the final account of a construction project. According to Clause 30.10 of the PAM Contract 2018 (With Quantities), Agreement and Condition (PAM [Pertubuhan Arkitek Malaysia], 2018), if not otherwise specified, the final account completion period shall be 15 months from the date of practical completion (as displayed in Figure 1). This duration typically includes the contractor's submission of the final claim, the valuation and preparation by the quantity surveyor, the agreement between the client and contractor on the final account and the architect's finalisation and certification. Notably, a successful conclusion of the final account is when all financial transactions are resolved within the designated timeframe without dispute or delay (Kong and Yeow, 2016; Kwok, 2009) to the satisfaction of key parties and stakeholders involved in construction projects (Ismail, Zakaria and Yusof, 2014; Ramli, 2021). Consequently, the assessment and agreement of the final account are crucial for both the client and contractor in the final account closing process of construction projects.

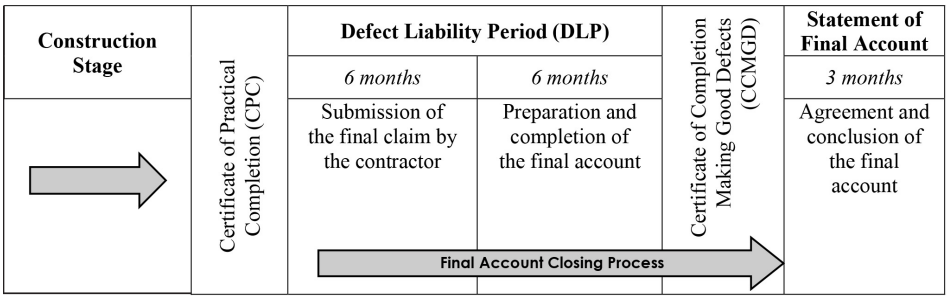

Figure 1. Procedure for the closing of the final account based on *PAM 2018 Standard Form of Contract*

Dispute Determinants in the Final Account Closing

The Malaysian construction industry faces several disputes involving final account closing in government and privately funded projects (Othman et al., 2023). Lew, Tan and Wong (2013) and Hassan (2019) discovered in their studies that the final account always takes longer than stipulated in the contract provisions. According to Zakaria, Ismail and Yusof (2022), disputes over final accounts impact payment delays in the industry, which in turn affect contractors' cash flow and other companies along the supply chain, such as subcontractors and suppliers. Disputes may also affect the construction industry's productivity in terms of quality, time, cost and human resources (Ramli, 2021).

Normally, the construction contract sets out the obligation and timeline for submitting, preparing and certifying the final account. If one party fails to comply or misapplies certain terms related to the provision of the final account, disputes may arise (Kong and Yeow, 2016). For example, when a contract administrator issues a final certificate, a contractor is entitled to receive the remaining amount owed under the final account. However, in the event that the employer fails to make the final payment after the final certificate is issued, the dispute will be initiated. Kong and Yeow (2016) added that disputes occurring during the final account process may result in the delayed closing of the final account. If the parties bring up the dispute using any resolution method as provided under the contract, the final account closing will be prolonged until the conclusion of the dispute (Zakaria, 2015).

Several factors that may contribute to the disputes in the final account closing have been highlighted in the existing literature. Several researchers have identified three categories of factors that contribute to final account closing disputes: client-related, contractor-related and contractual-related (Zakaria, Ismail and Yusof, 2013a; Ilmi and Yip, 2014; Romli, 2015; Yahaya,

Abidoye and Saidu, 2019; Ssegawa, Rwelamila and Mogome, 2020; Ramli, 2021). Furthermore, Zakaria (2015) discovered that management-related factors contribute significantly to final account closing disputes. Moreover, human behaviour, variation and external factors contribute to the final account-closing dispute (Sing et al., 2013; Romli, 2015; Ramli, 2021). Considering the previous research outlined in Table 1, this study identified and categorised seven groups of final account disputes, namely (1) clients, (2) contractors, (3) contractual, (4) management, (5) variations, (6) human behaviour and (7) external factors.

Table 1. Contributing factors to the dispute in final account closing

Categories	Factors of Dispute in Final Account Closing	Sources
Contractor	1. Failure to follow procedures in the final account claim 2. Delay in submitting the final account claim 3. Disagreement on the valuation of the final account 4. Poor record-keeping and lack of supporting documents 5. Lack of experience in estimating the cost of the project 6. Inefficient planning and management of the project 7. Incompetent and insufficient staff to handle the final account process	Ilmi and Yip (2014); Ismail, Zakaria and Yusof (2014); Ramli (2021); Ssegawa, Rwelamila and Mogome (2020); Yahya, Abodoye and Saidu (2019)
Client	1. Withholding or refusing to release the final payment without a reasonable reason 2. Imposing extra work during the defect liability period	Ramli (2021); Ssegawa, Rwelamila and Mogome (2020); Yahya, Abodoye and Saidu (2019)
Management	1. Delay in certification and issuance of the final certificate 2. Delay in issuance of the CCMGD 3. Delay in evaluation and preparation of the final account 4. Inadequate experience of Quantity Surveyor in handling the final account process 5. Lack of communication and cooperation among parties in the project	Hasmori, Ismail and Said, (2012); Ramli (2021); Ssegawa, Rwelamila and Mogome (2020); Ye and Rahman (2010); Zakaria, Ismail and Yusof (2013b)

(*Continued on next page*)

Table 1. *Continued*

Categories	Factors of Dispute in Final Account Closing	Sources
Contractual	1. The ambiguity and lack of clarity in the contract terms 2. The terms of the contract are too complicated to be understood 3. The contractual provision is not comprehensive 4. Mistakes and discrepancies in the contract document 5. The allocation fund provided for risk and contingency events in the project is insufficient	Kong and Yeow (2016); Ramli (2021); Ssegawa, Rwelamila and Mogome, (2020); Zakaria, Ismail and Yusof (2014)
Variation	1. Cost overrun due to variation and provisional quantities 2. Delay in approving and finalising variation work for the adjustment contract sum 3. Verbal instructions for variation works are not confirmed in writing 4. The complexity of the valuation and claim process for variation works 5. Disagreement among contracting parties on the valuation of variation works	Ilmi and Yip (2014); Romli (2015); Zakaria (2015); Hisham and Othman (2021)
Human Behaviour	1. Lack of commitment among parties to settle the final account promptly 2. Misunderstanding of the contracting parties on the contract condition	Sing et al. (2013); Romli (2015); Ahzami (2017); Hassan (2019); Ramli (2021)
External	1. Fluctuation of construction material prices 2. Force majeure events 3. Inclement or extreme weather 4. Changes in regulations and policies	Romli (2015); Ahzami, (2017); Ssegawa, Rwelamila and Mogome (2020); Ramli (2021)

RESEARCH METHODOLOGY

Data Collection

This study gathered information and data from secondary sources, mainly through a literature review, as well as primary sources by employing a questionnaire survey. Questionnaire surveys efficiently gathered a large sample size to collect quantitative data for analysis. In addition, the findings from the literature review were essential as they formed the basis for progressing to the subsequent stage of the research.

The study respondents were categorised into three groups: private clients or developers, G7 contractors and quantity surveyor consultants. This was in view of the fact that these groups were identified as the main stakeholders who play a crucial role in the final account process by being responsible for submitting, valuing, preparing, completing and certifying the final account in construction projects (Judi and Mustaffa, 2023; Nayan, 2021). Moreover, including the client, G7 contractor and quantity surveying (QS) consultant as respondents in this current research was imperative for acquiring a comprehensive and multifaceted understanding of the issues. They could contribute to the improved identification of the root causes of disputes and facilitate the development of effective prevention and resolution strategies. In addition, the selection of G7 contractor companies was justified since they are usually involved in large projects, employ a substantial number of workers, subcontractors and suppliers and have unlimited tender capacity (Lew et al., 2018). This enabled a comprehensive examination of final account closing issues in the Malaysian construction industry.

Information on potential respondents was obtained from relevant associations and professional bodies. This includes the Real Estate and Housing Developers Association Malaysia, the Construction Industry Development Board Malaysia and the Board of Quantity Surveyors Malaysia. Accordingly, it has resulted in a total population of 1,217 clients, 9,245 G7 contractors and 409 QS consultants across all states in Malaysia. Based on the identified population number from each respondent group, 295, 378 and 200 samples were derived for the private client, Grade 7 contractors and QS consultant, respectively, which were calculated using the formula by Krejcie and Morgan (1970).

The questionnaire consisted of three sections. Section 1 gathered information about the respondents' demographics, including their organisation, designation, years of experience in the construction industry and the types of projects they were mainly involved in. Section 2 contained questions about the current situation and scenarios related to final account closing, such as the challenges or difficulties of the final account closing process and the time to settle final accounts in construction projects. Section 3 was intended to establish a level of agreement among the respondents based on the factors contributing to disputes in the final account closing. The study's literature review identified 30 factors that may lead to disputes in the final account closing in construction projects, as summarised in Table 1. The survey was designed to assess respondents' level of agreement with these 30 determinants based on their judgement and experience in managing the final account closing process in construction projects in Malaysia. The five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), was used to gauge the level of agreement and to calculate the mean score for each contributing factor of final account closing disputes. Accordingly, ranks were assigned to the mean scores, with lower mean scores receiving lower ranks and higher scores allocated to higher ranks.

A pilot survey was conducted to evaluate the suitability and clarity of the questions and to enhance the content validity and reliability of the research. The reliability of the questionnaire was assessed by calculating Cronbach's alpha value. Following the pilot survey, adjustments were made, including reducing the number of questions and reformatting and refining the scale used. Correspondingly, all feedback was carefully integrated into the final version of the questionnaire before it was distributed. Data collection extended over three months in 2023, with four weeks for the respondents to complete and return the questionnaire. The convenience sampling method was utilised and the respondents were selected based on their availability and accessibility to the researcher. This approach is deemed appropriate in research with a specific target population that satisfies certain criteria to achieve research objectives (Zia et al., 2022). The questionnaire was distributed through Google Forms and in hard copies to accommodate diverse respondents' preferences. For the online questionnaire, online invitations were administered through social media platforms, such as WhatsApp and email. An email reminder was sent as a follow-up strategy to maximise the response rates. At the end of the data collection, 257 out of 873 questionnaires were collected, resulting in a response rate of 29%, which is considered common and acceptable in construction-related research (Krejcie and Morgan, 1970; Takim, Akintoye and Kelly, 2004; Fellows and Liu, 2015; Fateh and Nijar, 2019).

Data Collection

The data collected from the paper-based questionnaires and Google Forms were documented and transferred into Microsoft Excel for seamless organisation prior to being imported into the Statistical Package for the Social Sciences (SPSS) software for further analysis. Descriptive statistics were used to analyse the questionnaire survey data. Frequency analysis was used to examine the demographic profile data in Section 1 of the questionnaire. Meanwhile, descriptive analysis was employed in Sections 2 and 3, covering current scenarios and contributing factors of disputes in the final account closing. The mean score was used to determine the ranking of each variable since it is commonly employed in exploratory and descriptive data analyses (Shehu, Endut and Akintoye, 2014).

Reliability testing using Cronbach's alpha was conducted to measure the internal consistency of the questionnaire. According to Hair et al. (2019), an alpha value exceeding 0.70 indicates that the questionnaire instrument has sufficient reliability and internal consistency. Based on the 30 items calculated, Cronbach's alpha was 0.829, indicating that the items were interrelated and consistent with the study sample. The normality of the data was tested using the Kolmogorov-Smirnov test. The results obtained for the Kolmogorov-Smirnov test indicated that none of the quantitative variables were normally

distributed (Sig. value < 0.05). Therefore, a nonparametric technique was used for the analysis. The Kruskal-Wallis test is a nonparametric method used as an alternative to one-way Analysis of Variance (ANOVA) when the assumptions of the parametric tests are unmet (Ostertagová, Ostertag and Kováč, 2014). This method can be used to determine whether there are statistically significant differences among three or more groups of independent variables on a continuous or ordinal dependent variable (Schmidt, 2022). Furthermore, this can identify the mutual perception and understanding among respondents regarding the possible factors contributing to disputes in final account closing.

RESULTS AND DISCUSSION

Demographic Background

Table 2 presents the demographic profile of the construction professionals involved in this study. The data revealed that most of the respondents involved in the survey were construction professionals from G7 contractor companies, accounting for 42% of the total responses, followed by QS consultant firms (31%) and clients (26.7%). The diverse group of construction stakeholders involved in the survey assumed that the research findings were reliable and vigorous, as clients, contractors and quantity surveyors are key players in the construction industry. With regard to designation in the organisation, most of the respondents were quantity surveyors, with 158 respondents (61%), followed by contract managers at 16%. Respondents who held positions as company directors comprised 10%, while 7% and 6% of the respondents were engineers and project managers, respectively. The distribution of respondents' experience in the construction industry revealed that the majority (n = 183, 71%) had more than 10 years of professional experience in the construction industry. Meanwhile, 50 of the respondents (20%) had experience of six to ten years, while 9% had experience of five years or less. The substantial years of professional experience of the respondents indicated that they had sufficient and reliable knowledge of the research subject matter. As for the type of projects the respondents undertook, the majority (43%) were involved in residential projects and 29% were involved in infrastructure projects. Note that 14% of the respondents were involved in infrastructure projects, followed by 10% involved in institutional projects. In addition, only 4% of the respondents were involved in other project types.

Table 2. The demographic profile of respondents

Demographic Information		Frequency	%
Type of organisation	Client	69	27
	G7 contractor	107	42
	Quantity surveyor	81	31
Designation in organisation	Director	25	10
	Project manager	15	6
	Contracts manager	42	16
	Engineer	17	7
	Quantity surveyor	158	61
Professional experience in the construction industry	1 year to 5 years	24	9
	6 years to 10 years	50	20
	More than 10 years	183	71
Type of projects undertaken	Residential	111	43
	Institutional	27	10
	Commercial	35	14
	Infrastructure	75	29
	Others	9	4

Scenarios of Final Account Closing Process in the Construction Project

Table 3 indicates the level of difficulty of the final account closing process, as perceived by the respondents. A significant proportion of respondents perceived the final account process in construction projects as challenging. Specifically, a total of 47% of respondents considered the process "Difficult" and another 5% found it "Very Difficult," cumulatively accounting for 52% of the total respondents. This suggested that more than half of the respondents faced significant challenges in managing the final accounts of construction projects, indicating underlying issues or complicated processes. A considerable portion of the respondents, 45%, described the process as "Moderate," suggesting that it was not overly complex but still recognised it as neither simple nor straightforward. Only a small percentage (2%) of respondents found the process easy and a mere 1% described it as "Very Easy." This suggested that a few respondents experienced minimal difficulty in the final account closing process for construction projects. Overall, the findings suggested that the final account process is generally perceived as fraught with challenges and problems. This is consistent with previous

research that has discovered that the final account process requires complex procedures that can be time-consuming and challenging for the contracting parties (Hisham and Othman, 2021; Ilmi and Yip, 2014; Othman et al., 2023). It often leads to disputes between parties and delays the final account settlement in a construction project (Hassan, 2019; Kong and Yeow, 2016; Ssegawa, Rwelamila and Mogome, 2020).

Table 3. Difficulties in the final account closing process

Level of Difficulties	Frequency	%
Very difficult	12	5
Difficult	120	47
Moderate	117	45
Easy	6	2
Very easy	2	1

Table 4 provides insights into the frequency of disputes during the final account closing process based on the type of funded project. According to the data, government-funded projects demonstrated a lower incidence of disputes, with 5% of respondents reporting “Never” experiencing disputes, compared to 4% for private-funded projects. Moreover, a total of 13% of government-funded projects reported “Rarely” as opposed to only 5% of private-funded projects. Conversely, private-funded projects faced more frequent disputes, with 38% of respondents indicating disputes occur “Often” and 19% “Very Often” compared to 32% and 16% for government-funded projects, respectively. Overall, the findings suggested that privately funded projects in the Malaysian construction industry are more susceptible to frequent disputes during the final account closing. Previous researchers also support this. For example, Badroldin et al. (2017) reveal that more than half of the respondents reported payment problems in private-funded projects compared to government-funded projects. This trend may be attributed to factors such as financial constraints, stakeholder interests and contractual management complexities. By contrast, government-funded projects benefit from more structured funding and administrative oversight.

Table 4. The occurrence of disputes in the final account closing based on the type of funded project

Level of Frequency	Government Funded Project		Private Funded Project	
	Frequency	%	Frequency	%
Very often	40	16	49	19
Often	83	32	98	38
Sometimes	89	35	88	34
Rarely	32	13	12	5
Never	13	5	10	4

Table 5 presents the average time taken to settle the final account in a construction project. In practice, the final account process commences after the issuance of CPC until the expiry of the defect liability period or the issuance of the CCMGD. According to the *PAM 2018 Standard Form of Contract*, the process should be completed within 15 months of issuing CPC. In this study, the final account was considered closed when the final account statement was conclusive and satisfied all parties in construction projects. This was followed by settling all payments and financial transactions, including retention money after the defect liability period.

Based on the data in Table 5, most respondents (31%) reported an average of two to three years to close the final account in construction projects. Additionally, 27% of respondents stated that it took three years to five years to settle the final account, followed by 6% who reported more than four years, reflecting severe difficulties in closing the final account. Overall, a high number of respondents (64%) experienced a settlement period of two years to four years or more to close final accounts. This suggested that delays in final account closing are prevalent in construction projects. Moreover, this reinforces the findings of previous studies that have indicated that final account closing is often delayed (Hassan, 2019; Ramli, 2021).

Table 5. Average time to settle the final account in construction projects

Average time	Frequency	%
More than 4 years	15	6
3 years to 4 years	69	27
2 years to 3 years	79	31
1 year to 2 years	60	23
Less than one year	34	13

Key Factors Contributing to Disputes in the Final Account Closing

In the current study, mean analysis was employed to identify and rank the most significant factors contributing to final account closing disputes, as perceived by the respondents. As previously explained, the respondents were given a scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) to assess the significance of various factors/determinants contributing to disputes during the final account closing process. In this study, the impact of factors with mean scores ranging from 4.00 to 5.00 is regarded as "highly influential" or "very critical" to represent disputes in the closing of final accounts in construction projects (Adedokun, Ibironke and Babatunde, 2013; Ismail, 2021; Shehu, Endut and Akintoye, 2014; Takim, Akintoye and Kelly, 2004). These factors were identified earlier to prevent disputes and ensure the final account could be settled promptly. Table 6 presents the ranking of factors contributing to disputes in the final account closing, as assessed by the respondents.

The analysis of the survey data demonstrated that the mean scores for the 30 factors affecting disputes in the final account closing, as rated by the overall respondents, ranged from 2.12 to 4.16. Notably, a sum of eight factors was considered to have a highly influential impact, with mean scores surpassing 4.00. These factors included (1) delay in the evaluation and preparation of the final account (M = 4.16), (2) the complexity of the valuation and claim process for variation works (M = 4.14), (3) delay in approving and finalising variation work (M = 4.10), (4) disagreements on the valuation of variation works (M = 4.09), (5) poor record-keeping and lack of supporting documents for final account claims (M = 4.08), (6) delays in submitting the final account claim (M = 4.06), (7) disagreement on the valuation of final work done (M = 4.05) and (8) cost overrun due to variation and provisional quantities (M = 4.04). Moreover, a total of 16 factors were perceived to have a moderate influence, with mean scores ranging from 3.06 (i.e., withholding of final payment) to 3.89 (i.e., delay in certification and issuance of the final certificate). The remaining six factors were considered to have a low influence in contributing to disputes in final account closing, with a mean value below 3.00 (as shown in Table 6).

Table 6. Ranking of factors contributing to the dispute in final account closing

Factors Contributing to Disputes in Final Account Closing	Overall		Client		Contractor		Consultant		Kruskal-Wallis (Sig. p)
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
Delay in evaluation and preparation of the final account	4.16	1	3.99	6	4.36	1	4.06	6	0.096
The complexity of the valuation and claim process for variation works	4.14	2	4.01	5	4.29	2	4.06	5	0.043*
Delay in approving and finalising variation work for the adjustment contract sum	4.10	3	4.16	1	4.12	6	4.44	1	0.087
Disagreement among contracting parties on the valuation of variation works	4.09	4	4.06	2	4.21	4	3.95	8	0.158
Poor record-keeping and lack of supporting documents	4.08	5	4.03	3	4.17	5	4.12	2	0.121
Delay in submitting the final account claim	4.06	6	4.03	4	4.27	3	3.81	9	0.073
Disagreement on the valuation of the final account	4.05	7	3.94	7	4.09	7	4.09	4	0.300
Cost overrun due to variation and provisional quantities	4.04	8	3.91	8	4.06	8	4.12	3	0.274
Delay in certification and issuance of the final certificate	3.89	9	3.81	12	3.89	9	3.99	7	0.095
Lack of communication and cooperation among parties in the project	3.72	10	3.71	15	3.77	13	3.67	13	0.687
Verbal instructions for variation works are not confirmed in writing	3.71	11	3.88	10	3.49	20	3.73	11	0.027*

(Continued on next page)

Table 6. *Continued*

Factors Contributing to Disputes in Final Account Closing	Overall		Client		Contractor		Consultant		Kruskal-Wallis (Sig. p)
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
Failure to follow procedures in the final account claim	3.69	12	3.88	9	3.50	19	3.79	10	0.009*
Lack of commitment among parties to settle the final account promptly	3.64	13	3.71	14	3.79	12	3.26	15	0.001*
Incompetent and insufficient staff to handle the final account process	3.61	14	3.72	13	3.50	18	3.67	12	0.229
Inefficient planning and management of the project	3.56	15	3.87	11	3.37	22	3.56	14	0.003*
Misunderstanding of the contracting parties on the contract condition regarding the final account	3.56	16	3.48	18	3.85	11	3.23	17	0.000*
Delay in the issuance of CCMGD	3.44	17	3.51	17	3.60	15	3.16	20	0.093
Lack of experience in estimating the cost of the project	3.35	18	3.57	16	3.28	24	3.26	16	0.163
Inadequate experience of quantity surveyors in handling the final account process	3.32	19	3.41	19	3.35	23	3.21	18	0.483
The allocation fund provided for risk and contingency events in the project is insufficient	3.30	20	3.13	20	3.52	17	3.15	22	0.015
Imposing extra work during the defect liability period	3.28	21	2.43	27	3.88	10	3.21	19	0.000*

(Continued on next page)

Table 6. *Continued*

Factors Contributing to Disputes in Final Account Closing	Overall		Client		Contractor		Consultant		Kruskal-Wallis (Sig. p)
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
Mistakes and discrepancies in the contract document	3.26	22	3.10	21	3.53	16	3.04	23	0.003*
The ambiguity and lack of clarity in the contract terms regarding the final account procedure	3.18	23	2.90	23	3.38	21	3.15	21	0.003*
Withholding or refusing to release the final payment without a reasonable reason	3.06	24	2.32	28	3.70	14	2.85	24	0.000*
The contractual provision for the final account aspect is not comprehensive	2.98	25	2.97	22	3.23	25	2.65	25	0.000*
The terms of the contract are too complicated to be understood by the parties in the project	2.83	26	2.75	24	3.21	26	2.41	26	0.000*
Changes in regulations and policies that caused additional costs on the project	2.55	27	2.61	25	2.63	27	2.41	27	0.194
Fluctuation of construction material prices	2.48	28	2.57	26	2.61	28	2.25	28	0.003*
Inclement or extreme weather disrupted the construction process	2.13	29	2.22	30	2.16	29	2.01	29	0.124
Force majeure events caused a delay in the progress of work	2.12	30	2.23	29	2.13	30	2.01	30	0.096

**Note*: *p*-value less than 0.05 = Significant difference.

The results of the eight critical factors contributing to final account closing disputes among project stakeholders are displayed in Table 6. It generally demonstrates no significant difference in opinion among the group of respondents, except for one factor, namely the complexity of the valuation and claim process for variation works, which had a *p*-value of 0.043. This factor was reported to have a higher influence on the dispute perceived by contractors than clients and consultants. This finding indicated that while there is consensus among key stakeholders on common final account closing issues, as previously stated in the literature, the emphasis on particular issues may differ among clients, contractors and consultants. Therefore, further investigations are required to address this issue. The following section provides a detailed discussion of each significant factor identified from the analysis.

Delay in Evaluation and Preparation of the Final Account

The evaluation and preparation processes of the final account for a construction project are critical in project management as they ensure accurate final calculation of all expenditures and the fair settlement of claims between the contractor and the client (Ilmi and Yip, 2014; Ismail, Zakaria and Yusof, 2014). However, despite its significance, the process of preparing final accounts for a construction project is often complex and time-consuming, frequently extending beyond the period specified in the construction contract (Lew, Tan and Wong, 2013; Ahzami, 2017). Insufficient time allocated for evaluating all final works can hinder the timely preparation of the final account (Ye and Rahman, 2010). At the management level, personnel changes can significantly impact the process. Delays can also occur when the contract administrator and quantity surveyor take longer than the contract stipulates to evaluate and prepare the final accounts (Hisham and Othman, 2021). For instance, a quantity surveyor who is responsible for the final account leaving the company due to retirement, transfer or resignation can lead to delays (Zakaria, Ismail and Yusof, 2012a; 2013b). Further, the new person taking over may require time to familiarise themselves with the project's specific requirements, potentially causing inconsistencies and additional delays. These delays can have significant consequences for all parties involved. Most notably, they can lead to late payments, affecting the contractor's cash flow. The financial strain faced by the contractor can impair their ability to meet their financial obligations or take on new projects, potentially causing a ripple effect throughout the construction industry.

Complexity of the Valuation and Claim Process for Variation Works

Variations in construction projects are often inevitable, yet their management presents significant challenges due to the subjective nature of valuations and the complexity of contractual provisions (Baloi and Price, 2003; Zakaria, Ismail

and Yusof, 2012b). This subjectivity and complexity frequently lead to disputes between contractors and clients, particularly in assessing variation claims (Othman et al., 2023; Ramli, 2021). While contracts typically include variation clauses, these provisions are sometimes inadequate in governing variations works that fall outside the contract scope (Ilmi and Yip, 2014). Consequently, contractors may seek to recover expenses for such works through quantum meruit or fair valuation basis, potentially leading to disputes. The basis for determining the value of variation works presents another contentious issue. While bills of quantities (BQ) are commonly used as a reference for the valuation of variation works, they may not always provide an accurate basis due to the different nature of works and quantities (Ramli, 2021). Furthermore, this discrepancy can result in conflicts between contractors' claims and quantity surveyors' assessments, further complicating the variation management process (Love et al., 2011). Moreover, the variation claims can be complex due to insufficient information on variation instruction and a lack of transparent communication in the assessment process (Odeyinka et al., 2011). As such, these complexities in variation claims and assessment processes can contribute to disputes and delay the final account closing process in the construction industry.

Delay in Approving and Finalising Variation Work for the Adjustment Contract Sum

The process of finalising variations work in construction projects is often fraught with challenges, leading to delays and disputes in closing the final account. One of the primary obstacles in finalising variations work is the delay in approval by the client or management, even if the work has already been executed on-site. This can significantly impede the closure of final accounts. Moreover, this delay might be due to the client's dissatisfaction with the quality of variation works performed by the contractor.

The approval process is further complicated by inadequate documentation and disagreements over the scope and necessity of variation works (El-adaway et al., 2016). At the same time, Offei-Nyako et al. (2016) highlighted that a significant hurdle in finalising variation orders is due to the question of whether the variation order is conducted due to genuine changes or due to design inadequacies by the consultant or work mistakes by the contractor. Perera and Dewagoda (2020) further asserted that issues in approving and finalising variation works frequently arise when there is a dispute about whether the contractor has performed the work without the architect's instruction. It also concerns whether the architect's instruction constitutes unauthorised variation under the contract or whether the variations ordered by the architect are fair and reasonable in accordance with contract provisions and terms of the doctrine of fair valuation. As such, delays and difficulties in resolving variation orders for projects may have a material adverse impact

on the contractor's financial condition, cash flows and results of operations. If this problem cannot be settled before the project is handed over to the client, the closing of the final account cannot be resolved within the period prescribed.

Disagreement Among Contracting Parties on the Valuation of Variation Works

Failure to agree to the valuation of variation works in a construction project may affect the closing of the final account due to uncertainty in the financial settlement process. When there is disagreement on the valuation of variation works, it becomes challenging to determine the actual cost of the changes made to the project. This leads to disputes and prolongs the final account closing process as both parties try to negotiate and reach a consensus on the fair value of the variations. Additionally, disagreement on the valuation of variation works can result in additional costs for the contractor (Oladapo, 2007). For instance, the contractor believes that the variations for a particular work should be assessed at a higher rate, while the owner holds a contrary view and insists that the variation works should be valued at a lower rate. This could result in financial setbacks for the contractor. Furthermore, uncertainty in the valuation of variation works can impact the project's overall financial commitment and planning (El-adaway et al., 2016). Without a clear understanding and agreement on the valuation of variation works, it becomes challenging for the client to know the ultimate financial commitment and for the contractor to properly assess and manage their financial resources (Alhilli and Rezoqi, 2021). Thus, disagreement on the valuation of variation works hinders the timely closing of the final account and creates financial risks and conflicts between the contracting parties.

Poor Record-Keeping and Lack of Supporting Documents for Submission of the Final Account Claim

According to Bakhary, Adnan and Ibrahim (2018), the construction industry faces significant issues with regard to inadequate documentation. In particular, the lack of proper record-keeping and documentation complicates the process of claim substantiation and leads to disputes and delays in final account closing (Zakaria, Ismail and Yusof, 2013a; Ilmi and Yip, 2014; Ssegawa, Rwelamila and Mogome, 2020). Poor record-keeping complicates and prolongs the claim assessment process as the investigation and verification of facts and evidence become more time-consuming. In other cases, the records might be well-maintained. However, the personnel handling the claims may be unable to present them effectively (Bakhary, Adnan and Ibrahim, 2015). The absence of supporting documentation can raise suspicion of fraudulent or inflated

claims and create an environment of uncertainty and mistrust, leading to disputes and legal action (Hai, 2020; Kong and Yeow, 2016). Several studies also reported that contractors' errors in submitting the final claim due to inadequate supporting documents for claims or incomplete submissions are significant contributors to disputes and delays in closing the final accounts (Hisham and Othman, 2021). In such cases, contractors are required to rectify these errors and resubmit their claims, leading to further delays in the final accounts process. Therefore, it is crucial to maintain good record-keeping and proper project documentation from the project's onset and throughout its execution until completion.

Delay in Submitting the Final Account Claim

It is crucial for construction projects to submit the final account claim promptly to efficiently close the final accounts and ensure project management success. Studies conducted by Ramli (2021) and Ssegawa, Rwelamila and Mogome (2020) discovered that delayed submission of claims by contractors is a significant factor leading to delays and disputes in final accounts. If a contractor fails to submit the required documents within the specified time, the contract administrator or quantity surveyor must promptly assess the final accounts based on the available information. This may result in an incomplete and inaccurate evaluation, potentially leading to disagreement on the final account valuation by the contractor. Additionally, Othman et al. (2023) discovered that a contractor's failure to follow procedures or guidelines in final claims may contribute to disputes and delays in closing the final accounts. Meanwhile, Bakhary, Adnan and Ibrahim (2015) revealed that inadequate time and lack of experience among a contractor's staff in preparing the final account claim can lead to this issue. In addition, the complexity of the project and the nature of any variation works directly affect the time required to accurately assess and compile the final account (Othman et al., 2023). These complexities necessitate a detailed review, which can be time-consuming. Furthermore, Ssegawa, Rwelamila and Mogome (2020) emphasised that the limited availability of skilled personnel and inefficient systems for managing and handling the final account claim process can cause delays in claim submission to the contract administrator and client.

Disagreement on the Valuation of Final Account

Disagreements over the valuation of work or the certified amount determined by the quantity surveyor in final accounts is a significant factor contributing to disputes during the closing of final accounts (Ameyaw et al., 2015; Ilmi and Yip, 2014; Othman et al., 2023; Ssegawa, Rwelamila and Mogome, 2020; Zakaria, 2015). The disagreements may lead to conflicts for contractors.

This is particularly due to incomplete or unavailable documents required to prepare the final accounts. Additionally, dissatisfaction with the quality of work occurring in the project may lead to disagreements on the valuation of work done or the amount in the final account (Peters, Subar and Martin, 2019). Note that conflicts and disputes arise when one party disagrees with the valuation of the work done on-site (Mohamad, Nekooie and Kamaruddin, 2012). Suppose there is a disagreement about the measurement or valuation of any part of the final accounts by the quantity surveyor. In that case, the disputing party can ask the contract administrator to review and decide. In addition, if the contracting parties are dissatisfied with the decision of the contract administrator, either party may refer the matter to a dispute resolution procedure in accordance with the contract, thereby prolonging the closing of the final account. Furthermore, Kong and Yeow (2016) highlighted those disagreements in the valuation of the final account led to conflicts between the contractor and the client and caused unfortunate delays in closing the final accounts.

Cost Overrun Due to Variation and Provisional Quantities

Variation works refer to changes or modifications made to the original scope of work during the construction phase, where these modifications are sometimes necessary due to design changes, unforeseen site conditions or client requests (Offei-Nyako et al., 2016). However, these variations often lead to increased costs, exceeding the initial budget and causing cost overruns (Ismail et al., 2023). Provisional quantities can also contribute to cost overruns and disputes in the final account closing (Offei-Nyako et al., 2016; Othman et al., 2023). Provisional quantities refer to estimated materials for works included in the contract but are not specifically defined or detailed during the tendering stage (Cunningham, 2017). Hisham and Othman (2021) defined provisional quantity as the items that cannot be ascertained or calculated during the tender preparation process. Thus, it is subject to final remeasurement in order to have a fair valuation. Nevertheless, these estimates are often based on assumptions or rough calculations (Morena and Amoah, 2021). According to Offei-Nyako et al. (2016), remeasurement creates chances for the contractor to gain more profit. Contractors may argue that they are entitled to additional payment for the extra work conducted due to variations or remeasurement of provisional quantities, while clients may dispute these claims and refuse to pay the additional costs. These disputes can result in delays in the settlement of the final account and can strain the relationship between the contractor and the client. Overall, variation works and provisional quantities in construction projects can lead to cost overruns and disputes in the final account closing due to the potential for unforeseen changes, inaccuracies in cost estimation and disagreements between contractors and clients (Muhamad, Ali and Najm, 2021). Therefore,

it is crucial for construction professionals to carefully oversee and control provisional quantities and variation works in the project to ensure transparency between all parties involved in construction projects and minimise the risk of cost overruns.

CONCLUSION

Failure to close the final account on time can cause inconvenience to the contracting parties, such as the client and the contractor, as it affects their business's profitability and cash flow. Therefore, this study attempted to recognise the key factors leading to disputes in final account closures to better understand their fundamental root causes. The findings revealed eight major factors: (1) delays in the evaluation and preparation of final accounts, (2) complexity in variation claims approval, (3) issues related to variation work, (4) disagreements on the valuation of variation works, (5) poor record-keeping, (6) late submissions of final claims, (7) disagreements on the valuation of final accounts and (8) cost overruns. These determinants highlight the need for improved project management practices to ensure the timely and fair settlement of final accounts.

In this study, a questionnaire survey was administered among industry professionals comprising G7 contractors, private clients and QS consultants. Descriptive statistics and nonparametric tests were employed to rank the critical determinants, ensuring the reliability and validity of the findings. The findings of this study contribute to the existing body of knowledge by systematically identifying the determinants of final account closing disputes in Malaysian construction projects. Future studies are proposed to employ a qualitative approach using semi-structured interviews with experienced construction practitioners. It aims to gain in-depth insights into the underlying root causes and an appropriate solution of the key factors for minimising disputes during the closing process of final accounts in construction projects. Overall, addressing the identified factors of disputes in final account closing is crucial for improving the efficiency and timely settlement of the final account, thus contributing to the overall success of construction projects.

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